


Verified Statement of Translation

I, Martin Geissler, hereby declare the following:

I am knowledgeable in **German** and English. I have reviewed the English translation of the description of the invention marked as Exhibit I, and believe the attached document to be an accurate translation thereof.

All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true. Further, these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: August 2, 2010



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Martin R. Geissler  
Reg. No.: 51,011

**Record of Invention**

03-B-102

Received by G-IP

**05 May 2003**

Dealt with:.....

BEHR

dated 30 April 03, page 1

**CONFIDENTIAL**Name of the  
inventionValve in intercooler air chamber in order to reduce charge air  
cooling**1) I (We) hereby report**

	1 <sup>st</sup> Inventor	2 <sup>nd</sup> Inventor	3 <sup>rd</sup> Inventor
- First and last name	Daniel Hendrix		
- Title			
- Employee No.	55424		
- Telephone / Department	3437 / E-A3		
- Home address	Known		
- Citizenship	German		

the above named invention.

This Record of Invention consists of 8 pages.**2) Information on the conception of the invention:**

	1 <sup>st</sup> Inventor	2 <sup>nd</sup> Inventor	3 <sup>rd</sup> Inventor
- Does the invention relate to your area of responsibility?	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no
- Who gave the impetus for the work (supervisor, team, customer, ...)?	customer		
- Reason for taking up the subject matter (project, complaint, ...)?			
- Were your ideas common in the field?	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no
- Was previous knowledge, prior work, product knowledge of the company used as a foundation?	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no
- Were company resources used (samples, computer, lab)?	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no
- Position in the company (foreman, SB, manager, ...)?	FGL		
- Contribution to the invention?	%	%	%

**3) Additional information:**

- Have communications (such as customer presentations) or publications (e.g., trade show) taken place or are they planned?
- If yes, when and what (e.g., drawing number)?
- What applications of the invention are planned?
- Is the invention considered independent (external to the company)?
- Do you wish to be designated as inventor?

<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
Discussion of possible solutions with DC, calendar week 21
<input type="checkbox"/> yes <input checked="" type="checkbox"/> no
<input type="checkbox"/> yes <input checked="" type="checkbox"/> no

**4) The following documents are attached in triplicate:**

- ☒ a.) Detailed description of the invention
- ☒ b.) Sketches, drawings (in black & white please, with no coloration and no gray tones)
- ☐ c.) Circuit diagrams
- ☐ d.) Test records
- ☐ e.) Samples, models, photos, etc.

- 5) I certify (We certify) that the above information, to the best of my (our) knowledge, is complete and precise, and that additional individuals are not involved in the invention. I (we) further expressly declare that I am (we are) the first to have made the invention, to the best of my (our) belief. I am (we are) not aware of any in-house or other prior use or description of the invention.**

Stuttgart, 30 April 2003

[signature]  
Signature of 1<sup>st</sup> inventor

Stuttgart, 30 April 2003

Signature of 2<sup>nd</sup> inventor

Stuttgart, 30 April 2003

Signature of 3rd inventor

**Attachments****4a.) Detailed description of the invention**

(please adhere approximately to the following outline)

**4.1) General description of the problem:**

Particulate filters are being used increasingly in passenger car diesel motors. These particulate filters have to be regenerated at certain intervals. Moreover, in some types of particulate filters it is also necessary to raise the temperature of the exhaust. Oftentimes, it is impossible to reach this high exhaust temperature when outdoor temperatures are cold. If cooling of the charge air could be successfully reduced, the required exhaust temperature can be reached.

**4.2) Prior art/state of the art** (e.g., technical articles, patents, products), please be sure to specify:

The following are possible:

1. A bypass of the intercooler (Peugeot 807).
2. "Reheating" of the intake air after the intercooler.
3. Heating of the exhaust.

**4.3) Disadvantages in the prior art:**

regarding 1.: takes a lot of additional installation space; a bypass valve is very expensive.

regarding 2.: an additional heat exchanger (cost, installation space)

regarding 3.: an additional heat exchanger (cost, installation space)

**4.4) Object of the invention:**

to find a possibility for preventing/reducing cooling of the charge air without additional installation space and at low additional cost

**4.5) Inventive solution of the object:**

it is proposed to install a valve in the inlet or outlet chamber, by which means the charge air flow can be manipulated such that only a few charge air pipes have charge air flowing through them at the desired operating points. As a result, the charge air cooling worsens, and the temperature of the exhaust is higher than in standard charge air cooling.

This solution has been proposed by DC.

However, some technical aspects must be considered critical here: for example, temperature stresses between "cold" and "hot" pipes; mounting of the pivot axis in the air chamber.

**4.6) Alternative solutions and options for circumvention:**

Another possibility consists in placing a louver between the intercooler and radiator, and in this way to prevent the flow of cooling air and hence cooling of the charge air.

**4.7) Advantages of the invention:**

With no additional installation space, it is possible to achieve worsening of charge air cooling at certain operating points in order to achieve the highest possible exhaust temperature.

## Reduced charge air cooling

Square valve in front of the pipes

[diagram:]

Valve

Air chamber

Pipe

[diagram:]

VALVE

Pipe 1 and N have flow passing through

Pipe 2 through N-1 closed off

Pivot axis is off-center!

- Square valves not in production to date
- Off-center pivot axis
- Mounting of the pivot axis uncertain / not possible
- Chamber height must be straight over 45-70 mm (significantly lower strength of the air chamber)
- Very high stresses resulting from temperature differences between hot (with flow) and cold (sealed) pipes

Valve on the outlet side:

- Closing against the high charge pressure requires a very high closing torque

Valve on the inlet side:

- Valve under very high temperature stress

## Reduced charge air cooling

Round valve in the air chamber (outlet) in order to divide the charge air flow

[diagram:]  
Outlet

Inlet or outlet

- Round valve with centered pivot axis
- Mounting of the pivot axis uncertain (cast chamber?)
- Very high stresses resulting from temperature differences between hot (with flow) and cold (sealed) pipes
- Pressure stability of the interior walls not certain
- Additional pressure drop on the charge air side at all operating points

## **Reduced charge air cooling**

Round valve in the inlet/outlet chamber in the case of U-shaped flow path in intercooler

[diagram:]

- Round valve in the baffle between inlet and outlet in the case of U-shaped flow path in intercooler
- Mounting of the pivot axis uncertain (cast chamber?)

[handwritten: was produced by PSA approximately 4 years ago]



## **Reduced charge air cooling**

Louver in front of/behind intercooler in order to prevent cooling air flow

[photo]

- Used in Daimler/Chrysler E-Class
- Placement between intercooler and radiator in order to prevent damage from being struck by stones or the like
- Cooling of the charge air can be prevented almost entirely
- Influence on radiator (reduced efficiency) must be checked